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ABSTRACT

Designed for elementary and perhaps junior high school students, this activities-animal-tracks packet is a multi-disciplinary educational lesson which provides students with an opportunity for learning through "self discovery". Comprised of narrative and illustrative directions and suggestions, the activities described here include the following: suggested pre-trip activities for social studies, physical education, health, mathematics, science, language arts, and art; a metric measurement sheet; a modified key to common winter animal tracks in Cortland County, New York (includes 12 illustrations and descriptions); a pre-trip orientation plan (includes a discussion of animal tracks in terms of where the animal was going, what he was feeding on, whether he was frightened, running, or walking, etc.; a survey form for recording animal tracks, and a discussion of proper clothing); a lesson involving orientation-acclimatization activities and the actual survey of animal tracks; post-trip activities in social studies, mathematics, language arts, science, and art. (JC)

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WINTER OUTDOOR EDUCATION ACTIVITIES:

Animal Track Identification

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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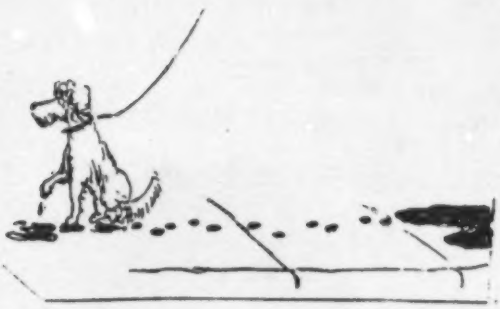
INTRODUCTION

The winter outdoor activities/animal tracks packet is a multi-disciplinary educational lesson, which provides students with an opportunity for learning through "self discovery". In Outdoor Education we do not extract the student from the classroom, but enlarge it instead. The out-of-doors provides a natural learning environment. Students are extremely motivated and interested in the activities which occur in nature's classroom. A total involvement in learning on the part of each individual student is indeed the goal of every educator. We in Outdoor Education believe that only by "doing" can this goal become a reality.

The winter outdoor/animal tracks lesson enables students to have a creative learning experience. Animal life is all about us, and so are educational opportunities. The study of animals fascinates children and can be channeled very easily into an unforgettable learning experience. The excitement of finding an animal track imbedded in the snow is enough to send a child's mind into an inquisitive state. The educational opportunities at this stage are now unparalleled. Through utilizing the material in this packet the teacher can channel these opportunities into a viable learning experience.

We in Outdoor Education use many different activities to achieve the goal of providing wholesome, individual educational experiences which totally involve and challenge the student. This is but one of the activities that is available to you and your students. By using the outdoors as an educational resource, educators can more fully reach the goal of developing the whole child, sensitive and aware of himself and other fellow beings, and cognizant of his role in the total scheme of life.



SUGGESTED PRE-TRIP ACTIVITIES

In presenting this educational lesson certain recommendations should be followed in order to maximize the potential of the learning experience. Below you will find a number of activities which will enhance and complement the actual track lesson. The activities are divided into subject areas for easier implementation. They are designed to take place before the outdoor experience in order to insure that the concepts covered in the lesson will be understood. These activities will also heighten the learning possibilities of the experience by providing a good background.

SOCIAL STUDIES

1. Discuss the different hunting techniques used by the native and colonial Americans. Compare this with today's techniques. Discuss Colonial, Indian, and modern hunting weapons.

2. Invite a guest speaker to speak on the topic of proper game management for your geographical area, as well as today's laws governing hunting and trapping.

3. Discuss the trapper of today, and compare him to early American trappers. Discuss the importance of fur in the economy, past and present.

4. Discuss the pros and cons of hunting in today's world. (*Careful, this is a touchy subject. There is much in the way of distortion, half-truths and emotionalism on this topic available today. Be sure you have the facts.*)

5. Discuss uses of animals and their fur, past and present.

PHYSICAL EDUCATION

1. Discuss and determine means of traveling on snow used by man. Determine if any of man's means of travel have been adapted from animals.

2. Have students make snowshoes, skis or other snow travel equipment with natural materials. Let them test their creations.

HEALTH

1. Discuss hypothermia, its causes, effects, symptoms, how to avoid it, and what to do when it happens.

MATHEMATICS

1. Review the metric system of measurement. The students will be measuring the tracks in both inches & centimeters. It will be necessary for each student to have or create a measuring device with which such measurements can be made. *(See enclosed sheet on metrics)*

2. Review the concepts of length, width, and depth with your students.

3. Using pacing as a form of measurement, determine various distances in yards and meters. *(1 pace = 2 steps. Measure 100 yards or meters and determine number of paces it takes to walk the distance. Divide number of paces into 100 to find feet or meters per pace.)*

SCIENCE

1. Discuss hibernation and winter withdrawal concepts. Relate these concepts to various animals in this area.

2. Discuss the physiological changes which occur, in both animals that hibernate as well as those that do not, in winter. What animal tracks would you expect to find in January? What tracks would not be there?

3. Have the class discuss winter survival of animals (food source, habitat locations, physical adaptations, etc.)

4. Discuss & research the social aspects of the different animal life located in this area.

5. Review the chain-of-life concept with your students. Be sure they understand their relationship within this chain, and how they can influence it, and are affected by it.

6. Discuss seasonal changes in animal fur, camouflage, etc.

7. Use a frog to illustrate hibernation. Count heartbeats in warm room. Put frog in jar and immerse jar in ice bath. Count heartbeats and compare. Watch frog become dormant.

LANGUAGE ARTS

1. Have a number of students give a presentation to the class highlighting the life of a famous trapper/hunter.

2. List the famous trappers & hunters of America. Discuss the legends & stories still told about them. Produce a play or skit reflecting their lives.

3. Read stories about animals in winter. Ranger Rick magazines are a good source for this.

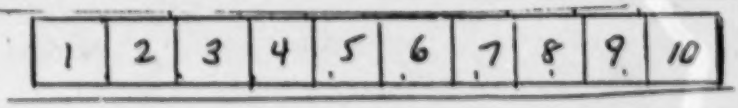
ART

1. Have the students collect dried plants & flowers found in winter. Place them in an arrangement.

2. Have the students make a snow sculpture.

METRIC MEASUREMENT SHEET

UNIT	ENGLISH			METRIC		
	Inches - feet	yard	mile	cm.	m.	km.
Inch	1/12 feet			2.54 cm.		
Foot	12 inches	1/3 yd.		30.48 cm.	0.305	
Yard	36 inches 3 feet			91.44 cm.	0.914	
Mile	5,280 feet	1,760				1.610
Centimeter (cm.)	0.3937 in.					
Decimeter (dm.)	3,937 in.					
Meter (m.)	3,281 ft. - 39.37 in.	1,094				
Kilometer (km.)			0.621			



THIS STRIP IS 1 DECIMETER (10 centimeters) LONG. When you think metric you would not ordinarily use the word decimeter. Although you know the strip is a decimeter long, you call it 10 centimeters. This is the terminology used by people in European countries.

Lay a strip of cardboard, back of ruler, or pencil along it. Then mark the cardboard, ruler, or pencil as we have done. Divide it into 10 parts - each one is a centimeter.

Get a long stick. Using your 10 centimeter strip, mark off 10 decimeters and also 100 centimeters. This will give you a meter stick.

METRIC CONVERSION EXAMPLE:

You find a track which is 2¼ inches long. How do you convert to metrics? Multiply the number of inches of track (2¼ inches), times the metric equivalent of our English inch (2.54 cm.)

2.25 inches (length of print)
x 2.54 cm. (metric equivalent)
5.715 cm. in length

To convert from centimeters back into inches, you divide the number of centimeters in length, (5.715 cm.) by the metric equivalent of an inch (2.54 cm.)

$2.54 \overline{)5.715}$ Answer = 2.25 inches

SIMPLE ISN'T IT?

Be careful - Watch your mathematics and computations.

A MODIFIED KEY TO COMMON WINTER ANIMAL TRACKS IN CORTLAND COUNTY

Explanation of terms:

Claws - tracks showing signs of toenails (claws)

Example:

Beaver

Non-claws; non hoofed - tracks do not show signs of toenail, and are not double (side-by-side), or clefted

Example:

Bobcat

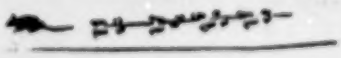
Hoofed - tracks show signs of double (side-by-side) or clefted track

Example:

Deer

Tail Drag - presence of tail drag indicated in snow between right and left track

Example:



Mouse

Measurement - all measurements below are of length of track in inches, from base of heel to top of toe or nail.

DOES THE TRACK HAVE:

1. A) Claws - see #2
   B) Non-claws, Non-hoofed - see #9
   C) Hoofed - see #12

2. Claws

   A) all four feet the same - see #3
   B) hindfeet larger than forefeet - see #4

3. All four feet the same - 4 toes showing

   A) Size: 2 ¼ inches forefeet; 11¼ inches between left prints and next right print - FOX

Example:

Fox

B) Size: 2½ inches forefeet; tracks almost inside each other - COYOTE

Example:

Coyote

C) Size: Vary; check location of tracks, i.e. habitat, closeness to man-made structures, etc. - DOG

Example:

Dog

4. Hindfeet larger than forefeet

A) webbed hindfeet with wide tail drag
BEAVER

Example:

Beaver

B) non-webbed - see #5

5. Non-webbed feet

A) five toes on all four feet - see #6
B) five toes on hindfeet, four toes on forefeet - see #7

6. Five toes on all four feet

A) Size: 4½ inches hindfeet; forefeet prints usually touching - RACCOON

Example:

Raccoon

B) Size: 2 5/8 inches hindfeet; forefeet have claws, hindfeet do not have claws - SKUNK

Example:

Skunk

7. Five toes on hind, four toes on forefeet

   A) Size: 1½ inches hindfeet, no tail drag
   WOODCHUCK

Example:

Woodchuck

   B) Tail drag indicated - see #8

8. Tail drag present

   A) Size: 2½ inches hindfeet
   SQUIRREL

Example:

Squirrel

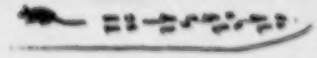
   B) Size: 3½ inches hindfeet - MUSKRAT

Example:

Muskrat

   C) Size: ½ inches or less hindfeet - MOUSE

Example:



Mouse

9. Non-clawed tracks

   A) all four feet the same - see #10
   B) hindfeet larger than forefeet - see #11
   C) forefeet has five toes (thumb-like toe extends off to the side of the print) hindfeet has four toes with extended 5th toe off to side - OPPOSSUM

Example:

Oppossum

10. All four feet the same size

A) Size: 1 1/8 inches both hindfeet and forefeet
CAT

Example:

Domestic Cat

B) Size: 3 inches hindfeet; 3 inches wide
BOBCAT

Example:

Bobcat

11. Hindfeet larger than forefeet

A) Size: 6 inches hindfeet; hindfeet shaped like foot of human
BLACK BEAR

Example:

Black Bear

B) Size: 3 inches hindfeet; smaller forefeet get further apart as speed of animal increases - RABBIT

Example:

Rabbit

12) Hoofed - All four feet the same size

A) Size: 3 inches; pointed at top - (Buck's tracks are longer and wider than a doe's). - WHITETAIL DEER

Example:

Whitetail Deer

B) Size: 4¼ - 4 3/4 inches; rounded at top (domestic Cattle)

PRE-TRIP ORIENTATION

The orientation period should take place no more than 3 days before the experience is conducted. It should contain a brief review and discussion of the outdoor lesson, touching on different aspects of the lesson. This should serve to create a mood, a positive attitude, and set the stage for the actual outdoor lesson. In addition, all technical aspects of the lesson should be gone over to be sure that the students understand what is expected of them. The following is a brief outline of orientation procedures which will help to facilitate the lesson.

I. Discuss animal tracks, including what animals make them, and what can be determined from them.

THINGS THAT CAN BE DETERMINED

1. Direction animal was going
2. Animal activities
3. Whether he was frightened, running or walking
4. What he was feeding on
5. Where animal was going
6. Where he lives
7. Type of animal
8. Approximate weight and size of the animal
9. If an animal has an injury
10. Different animals living in the same habitat
11. If animal was alone or with other animals

II. Survey Form

A. Hand out forms, 1 to each student
B. Draw a sample track on the board
C. Complete the survey form with the students step by step, explaining and demonstrating each aspect to insure complete understanding

III. Discuss proper clothing for winter outdoor activities. This is an essential area, and a thorough job should be done on this aspect in order to insure the success of this lesson. The following are some helpful hints on this area.

1. Thin layers of clothing are better than one thick layer. This enables layers to be removed as the person heats up. This is true for socks as well as top level clothing.
2. Do not sit in school all day with long underwear on and then go outside. This will only cause quick chilling.
3. The head is just as important to keep warm as any other extremity, and is the body's thermostat. When hot, remove hat, when cold, cover up!
4. Proper footware for winter outdoor activities should be stressed. The boot you select should command the qualities of comfort and warmth.
5. Pants should be loose but not baggy --- this will allow freedom of movement.

WHO GOES THERE?

WOODCHUCK

Fore and hind feet of woodchuck are much alike and placed close together

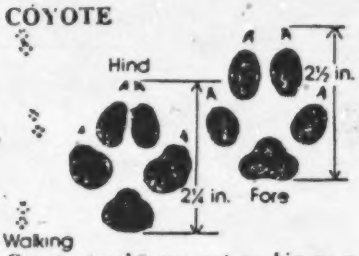
RACCOON

Raccoon has five toes on each foot; prints of front feet usually touch

BLACK BEAR

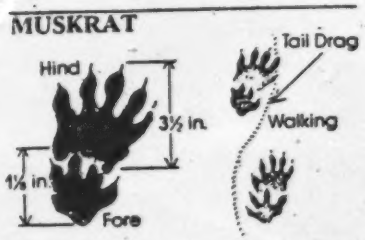
Shorter claws (about 1½ in.) often don't show in tracks of black bear

COYOTE



Coyote tracks are not so big as a wolf's nor so delicate as a fox's

MUSKRAT

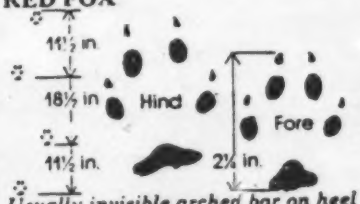


Muskrat shows four toes on front, five on hind feet. Tail leaves mark

BOBCAT

Ball of hind foot is smaller than forefoot, and pad has double lobe

RED FOX



Usually invisible arched bar on heel causes open area between heel, toes

COTTONTAIL RABBIT

As cottontail increases speed, the smaller forefeet get farther apart

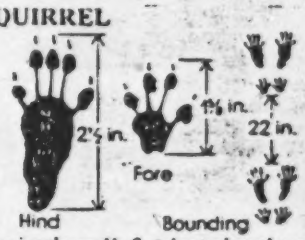
BEAVER

Hind foot is webbed, and feet toe in. Dragged tail leaves wavy impression

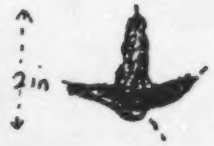
WHITETAIL DEER

Buck's tracks are longer and wider than a doe's. Dewclaws seldom show

SQUIRREL



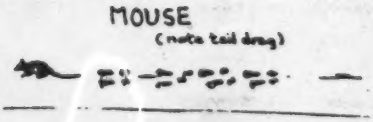
Squirrels walk flat-footed and ma a boxlike pattern when boundi



RUFFED GROUSE

WILD TURKEY

SKUNK



CANADA GOOSE

15

WINTER OUTDOOR ACTIVITY/TRACK IDENTIFICATION LESSON

This lesson is divided into two major parts, orientation/acclimatization and animal track survey. The plan below indicates activities which will orient the students as individuals, and as a group, to the wonders of the outdoors in winter. By experiencing the environment with all 5 physical senses to the fullest degree a more heightened awareness of the surroundings will occur. This will enhance not only the learning potential of the tracks lesson which follows, but also the students' understanding of the outdoors and natural processes.

ORIENTATION/ACCLIMATIZATION ACTIVITIES (Time 15 - 30 minutes)

1. Feel the snow; not touch, handle or lift, but feel it:

   - what does it do to your hand?
   - what does your hand do to it?
   - describe it in one word.
   - is it heavy or light?
   - etc.

2. Taste the snow first, then eat a mouthful:

   - what does it taste like?
   - what does it feel like in your mouth?
   - what does it feel like going down?
   - describe the taste in one word.
   - etc.

3. Smell the snow:

   - what does it smell like?
   - does it tickle your nose?
   - stick your nose in it and wiggle it around like a dog.
   - describe the smell in one word.
   - etc.

4. Listen to sounds made in snow:

   - how are they different from school sounds, playground?
   - describe snow sounds in one word.
   - let the falling snow hit you and listen for different sounds as it hits different parts of you.
   - etc.

5. See the snow, really see it:

   - look at its myriad shapes and crystal flakes.
   - use a small hand lens and examine the snow.
   - etc.

6. Other Sensory Activities:

- blindfold the students and do various snow activities with them.
- act out the parts of various animals - be a deer, mouse, fox, raccoon, rabbit, etc.
- catch a snowflake in your mouth.
- act out the parts of snow falling, a blizzard, snow melting, ice, snow packing down, becoming a snowman, snowball, etc.
- have students make an animal hiding place.

TRACK IDENTIFICATION LESSON (Time: 30 - 40 minutes)

On arrival a sample survey form should be filled out with the students. This will insure that the forms will be completed properly.

1. Sample Survey:

   A. have a small child & a large one go around the corner of the school building, (so they cannot be seen by the class) and have them walk and then run across the snow.

   B. take the class to the area where the tracks were made.

   C. use the tracks in filling out the sample survey form.

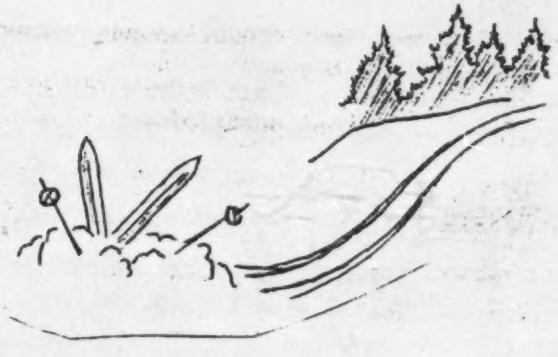
2. Divide class into small groups, (size of group depends on number and variety of tracks available in the area where survey is to take place).

3. Give a survey form(s) to each group.

4. Assign areas to each group to survey, and have them locate and survey any tracks.

5. Reassemble and briefly discuss findings outdoors.

6. If time and weather allows, examine each track discovered with the class. At any rate, any special discoveries should be examined.



SURVEY FORM

NAME: _____

length = heel to toe measure
width = at widest point

1. Forefoot length (inches) _____ width (inches) _____
   length (centimeters) _____ width (centimeters) _____

   Hindfoot length (inches) _____ width (inches) _____
   length (centimeters) _____ width (centimeters) _____

2. Depth of track at deepest point: Inches _____
   Centimeters _____

3. What is the distance between the first set of hind leg tracks and the next?
   Inches: _____ Centimeters: _____

4. Does the animal have: (Answer YES or NO)
   a) claws showing? _____
   b) webbed feet? _____
   c) 5 toes on all feet? _____
   d) 3 toes? _____
   e) tail dragging _____
   f) hindfeet different from forefeet _____
   g) hoofs _____

5. Is the track FRESH or OLD (circle one)

6. Where does the track lead to: _____
   _____

7. Where does the track come from: _____
   _____

8. Draw track in the space below:

   Fore Hind Pattern of travel (use dots)

9. Additional questions: a) what was the animal doing? _____
   _____ b) describe area where tracks were found: _____
   _____
   _____

10. What animal made track? _____

SUGGESTED POST TRIP LESSON ACTIVITIES

The Post Trip lesson in any educational experience is just as important as the actual lesson itself, if not more so. The Post Trip is designed to organize and reinforce in the student's mind the information that was acquired during the "hands on" learning experience. In the track identification lesson you will find that student motivation is high, which in turn provides a desirable learning situation. The activities listed below can provide direction for the students' motivation so that maximum learning efficiency can occur.

The Post Trip activities are divided into two parts; activities derived from considering the survey form, and activities under each subject area.

SURVEY SHEET CONSIDERATION

1. Discuss what animal was most prevalent in the area surveyed.
2. Determine the largest/smallest tracks found and what animal made them.
3. Determine the deepest track found and the animal that made it. Discuss the significance of the depth of the track.
4. Discuss the largest/smallest animal. Determine the effect of total animal size on the size and depth of their tracks.
5. Discuss the different size and shapes of the tracks found. Discuss what can be determined about the animal from the shape of his tracks.
6. What types of animals have claws? Webbed feet? Hoofs?
7. What type of animals have different hind feet from forefeet?
8. Discuss the different activities of the animals surveyed.
9. Discuss other methods used in identifying animals.
10. Discuss the different habitats of the animals surveyed, and how these animals are adapted to their habitats.
11. Discuss & determine the different nocturnal animals found.
12. What special stories can be determined from the tracks?

POST-TRIP ACTIVITIES IN SUBJECT AREAS

These activities may be class, group or individual in nature.

SOCIAL STUDIES

1. Research the names of the animals found. Discuss the origins of the animals, whether native or imported, domestic and why, etc.
2. Determine the history of the animal as it relates to its utilization by man, (political, economical, survival, etc.).
3. Determine and discuss the role of the trapper and fur trader in the development of New York State, the United States, and the trapper's routes of travel.
4. If the class contains students who run traplines, have them bring in their tools and demonstrate them.

MATHEMATICS

1. Determine the total inches & centimeters found in all the forefeet/hindfeet tracks surveyed. Convert them into feet & meters.
2. Utilize the metric conversion system in measuring classroom objects, heights, etc.
3. Utilize pacing in further metric measurement lessons.

LANGUAGE ARTS

1. Define and/or discuss the following terms:

   1. habitat
   2. nocturnal
   3. scatology
   4. burrows
   5. hibernation
   6. winter withdrawal
   7. dormant

2. Have a student/students dramatize the life of one of the animals whose tracks were discovered.
3. Have the students research well known poems & stories written about animals.
4. Write an essay on why the beaver is the official animal of New York State.
5. Write a story on "what animal I would most like to be."
6. Write a poem or story on being a snowflake, snowball, snowman.

SCIENCE

1. Discuss the concepts of wind chill factor. (see chart below)
2. Discuss the animals that hibernate and those that do not.
3. Discuss why certain birds are found in this area, and others are not.
4. Determine and discuss winter animal foods.

WIND SPEED		COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																			
KNOTS	MPH	TEMPERATURE (°F)																			
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60
		EQUIVALENT CHILL TEMPERATURE																				
3-6	5	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-65	-70
7-10	10	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75	-80	-90	-95
11-15	15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	-90	-100	-105	-110
16-19	20	20	10	5	0	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100	-110	-115	-120
20-23	25	15	10	0	-5	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-90	-95	-105	-110	-120	-125	-135
24-28	30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	-115	-125	-130	-140
29-32	35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	-120	-130	-135	-145
33-36	40	10	0	-5	-15	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125	-130	-140	-150
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT.		LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 min.)						GREAT DANGER (Flesh may freeze within 30 seconds)								
		DANGER OF FREEZING EXPOSED FLESH FOR PROPERLY CLOTHED PERSONS.																			

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ART

1. Have the students make potato prints of the animal tracks:
   a) slice a potato in half
   b) draw the track on the cut surface of the potato
   c) cut out the track drawing from the rest of the potato (*CARE MUST BE TAKEN WHEN USING THE KNIVES*)
   d) Press print on a inked stamp pad
   e) You can make one print or the entire track pattern
2. Have the student make animal tracks that they can wear on their feet. (taped to their boots) They can use cardboard, tin, etc. *Again, care must be taken with the knives.*
3. Have the students draw an outdoor winter activity involving animals & their tracks.

TEACHER TIPS AND SUGGESTIONS FOR IMPLEMENTING THIS UNIT

In implementing this unit certain suggestions can be made which will facilitate the learning process and eliminate certain pitfalls.

The teacher should pre-scout the area or use an area known for its wildlife. The number of tracks found will determine the number and size of the student survey groups. The type of snow most conducive to this lesson is new snow with medium moisture content, not too fluffy or powdery, wet enough to contain the imprint but not melting. Take advantage of this new snow when it falls! Most of the tracks will have been made overnight, so the morning is the best time.

Look for the teachable moment with stories in the snow. This may come about by the exciting discovery of a mouse trail abruptly disappearing with a pair of wingbeats, or a fox and grouse trail intersecting in a flurry of feathers. Look for other animal signs such as droppings, burrows, air holes, feathers, fur, etc. Tracks may be found on streambanks, snowy trees, fences, etc.

An hour or a little longer is adequate time for this lesson. Any longer and the children may become chilled, a situation which effectively eliminates most learning. If they get cold, take them in and finish the lesson later.

This lesson is designed for on or near school sites in areas where wildlife occurs. Most Cortland County Schools have areas within walking distance. The Outdoor Education staff will be most happy to provide further suggestions, assist in conducting the lesson or conduct the entire lesson. We may be contacted at 749-7241, Extension #2. Ask for Bruce Matthews.

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SELECTED FILMS AVAILABLE THROUGH CORTLAND-MADISON BOCES:

Animal Homes	#831-12
Animals In Winter	#841-4
Animals Move in Many Ways	#831-18
How Animals Live in Winter	#831-155

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CREDITS

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